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PRODUCTION ENGINEERING MEASURES FOR TEMPERATURE
JUN 74 D L THOMANN, H D HINNAN

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COMPENSATED MIC--ETC(U)
DAAB05-72-C-5839
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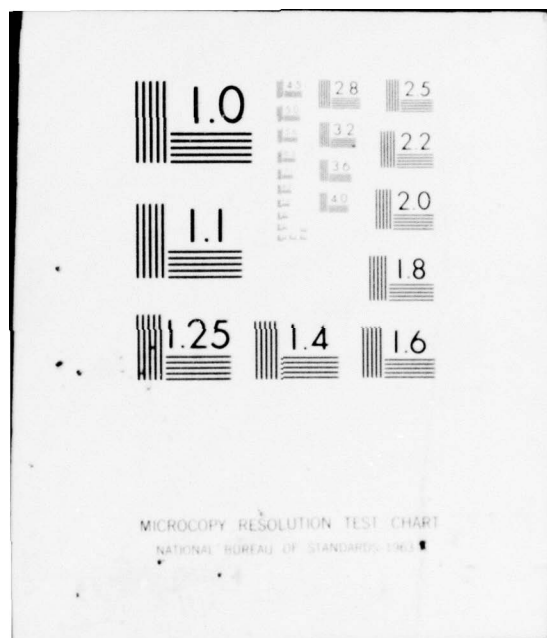
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PRODUCTION ENGINEERING MEASURES REPORT
DAAB05 - 72 - C - 5839

TEMPERATURE COMPENSATED MICROCIRCUIT
CRYSTAL OSCILLATOR

FIFTH QUARTERLY PROGRESS REPORT

BY

Donald L. Thomann
Howard D. Hinnah

1 MARCH 1973 TO 31 MAY 1973

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ECOM

Production Division, Procurement and Production Directorate
USAECOM, Fort Monmouth, New Jersey 07703

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SANDWICH ILLINOIS 60548

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ABSTRACT

Three engineering samples of the MCTCX0 were assembled using C-SOS MOS devices from the fourth manufacturing lot. Overall oscillator loop gain was found to be marginal at high temperature and it was determined that a change in the oscillator feedback ratio would correct the problem.

The custom cases and covers were received and evaluated. Although they were found to be satisfactory, improvements were suggested to add a margin of safety in production.

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PRODUCTION ENGINEERING MEASURES
FOR
TEMPERATURE COMPENSATED MICROCIRCUIT
CRYSTAL OSCILLATOR

FIFTH QUARTERLY REPORT
1 MARCH 1973 TO 31 MAY 1973

Contract No. DAAB05-72-C-5839

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Prepared By

Donald L. Thomann
Howard D. Hinnah

CTS KNIGHTS, INC.
SANDWICH, ILLINOIS

For

US Army Electronics Command
Ft. Monmouth, New Jersey

PURPOSE

The purpose of the work performed during the Fifth Quarter reporting period of 1 March 1973 to 31 May 1973 was to evaluate the first group of hybrid circuits utilizing integrated circuits from the fourth lot, to determine what changes were necessary and then to implement the changes.

DISCUSSION

As reported in the Fourth Quarterly Report, the C-SOS MOS devices from the fourth manufactured lot gave results very close to specification. The power consumption at 3.0 MHz was 15% over specification and at 10.0 MHz it was 12% better than specification. With this success, the supplier was asked to tighten the limits on threshold voltage slightly, add a limit on static current, and then test enough fourth lot chips to complete the engineering samples and first article units. A quantity of nine hybrid substrates utilizing these chips was received. Initial evaluation of the first three pieces indicated that the overall oscillator loop gain is marginal at the high end of the temperature range. This can be corrected by changing the value of one of the capacitors, shown in the schematic in Figure 1 as Capacitor C4. Fortunately, it is readily accessible and the change can be done in our facilities.

Samples of the custom case and cover were received in May and forwarded to our vendor for the coldwelding die for comment. Comments were received regarding the suitability of the case parts for reliable production sealing. We were advised that the flange clearance between the two case halves be tightened from a reference dimension to .002/.004 inch and that the corner radius of the upper half be reduced from a reference dimension to .080/.090 inch. These changes are not deemed mandatory, but are being made to add a margin of safety in production. Drawings 290-0625-0, Rev. B and 340-0988, Rev. A show the final results as Figures 2 and 3 respectively.

Photographs of one of the MCTCXO's are shown as Figures 4 through 7.

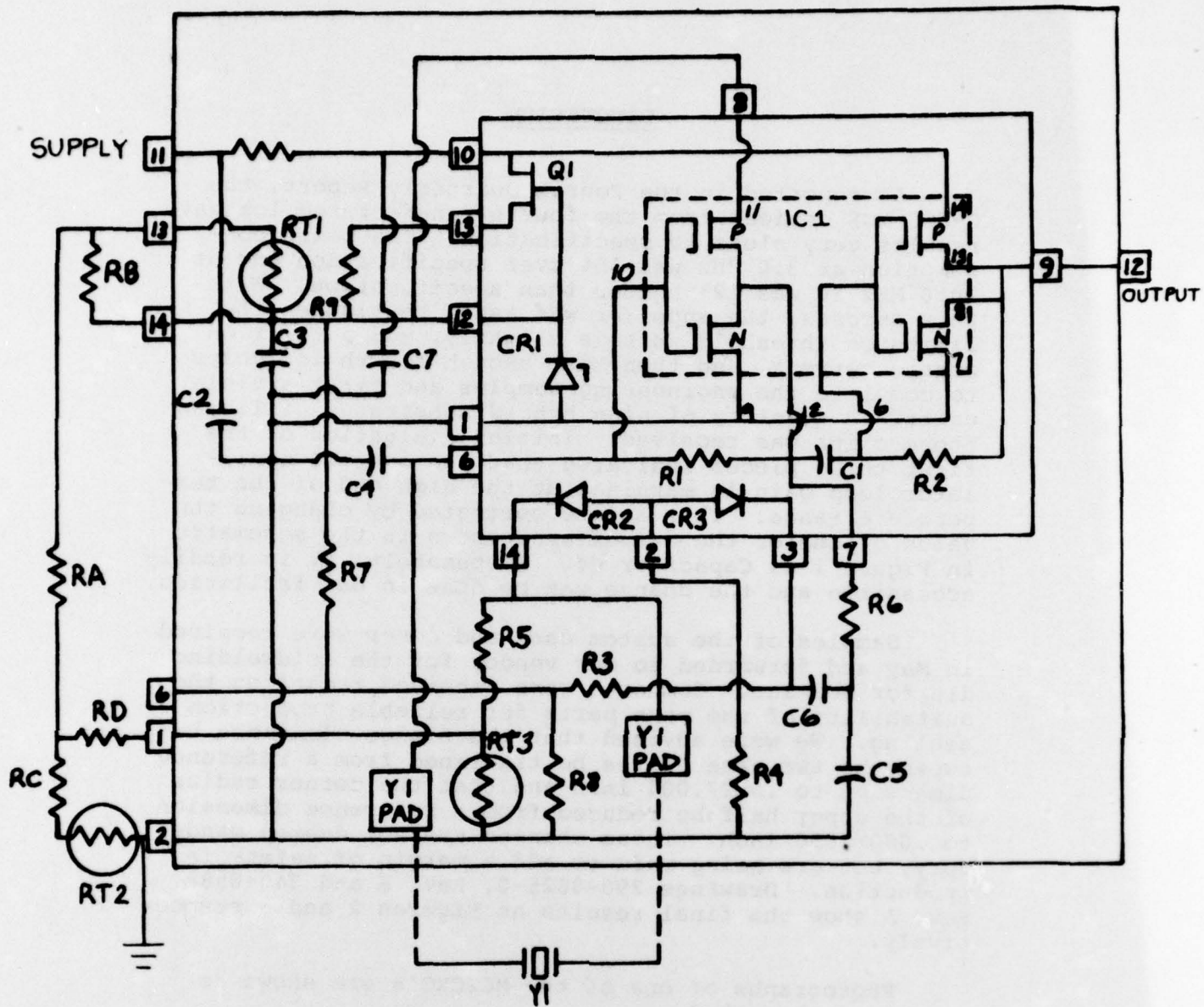
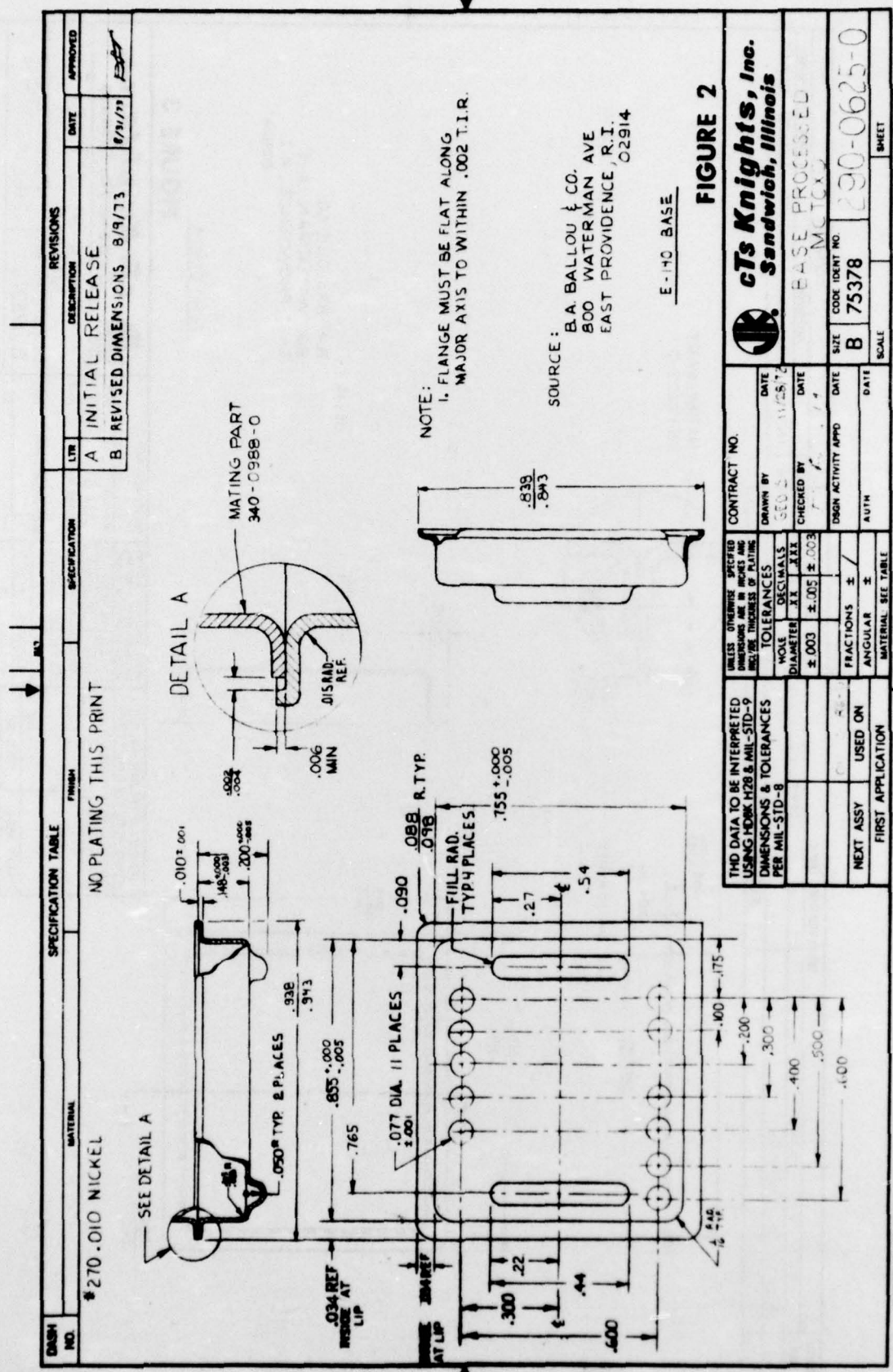
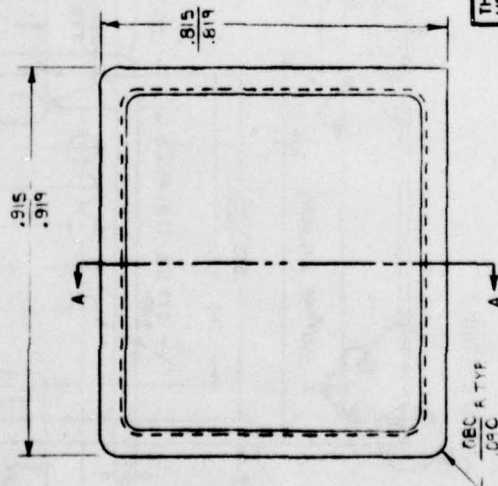
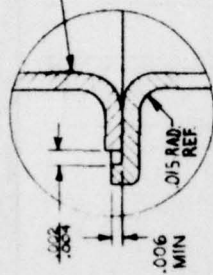
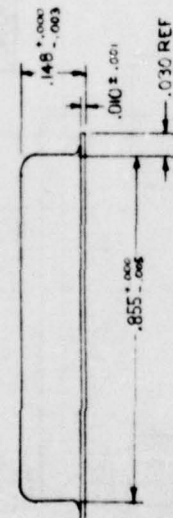


FIGURE 1



DASH NO.	MATERIAL	FINISH	SPECIFICATION	LTN	DESCRIPTION	REVISIONS	DATE	APPROVED
-1	# 270 .010" NICKEL			A	INITIAL RELEASE		8/31/72	
-0			ELECTROLESS NICKEL					



SOURCE:
B.A. BALLOU & CO.
800 WATERMAN AVE.
EAST PROVIDENCE, R.I. 02914

E-IHL COVER

FIGURE 3

CTs Knights, Inc. Sandwich, Illinois		COVER PROCESSED MCTC XO	
SIZE	CODE IDENT NO.	DATE	SHEET
B	75378	11/30/72	340-0033
CONTRACT NO.		DATE	
DRAWN BY		DATE	
GEO. S		11/30/72	
CHECKED BY		DATE	
SIGN ACTIVITY APPD		DATE	
AUTH		DATE	
NEXT ASSY		USED ON	
FIRST APPLICATION		MATERIAL SEE TABLE	

MATING PART 290-0625-0

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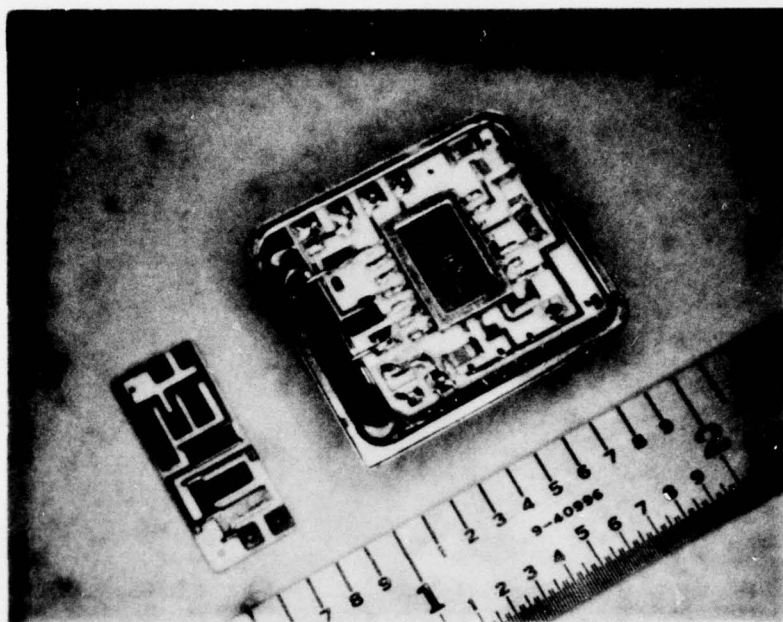


FIGURE 4

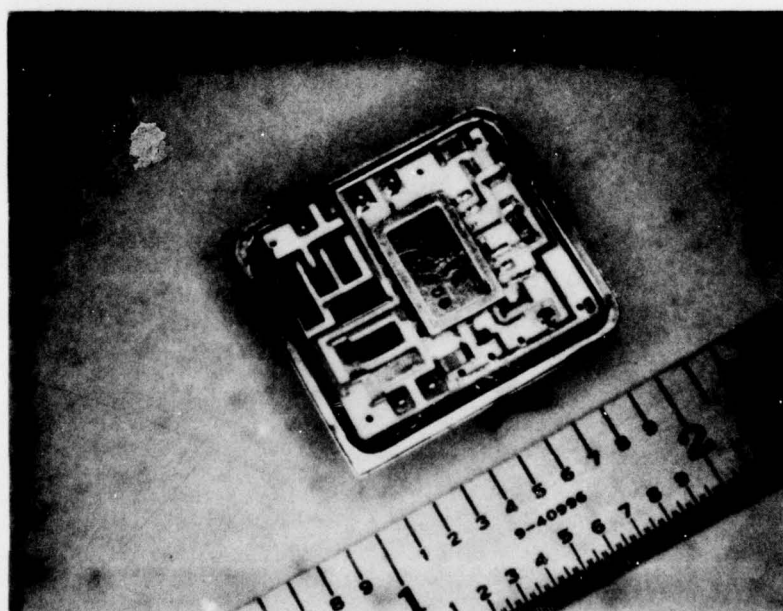


FIGURE 5



FIGURE 6

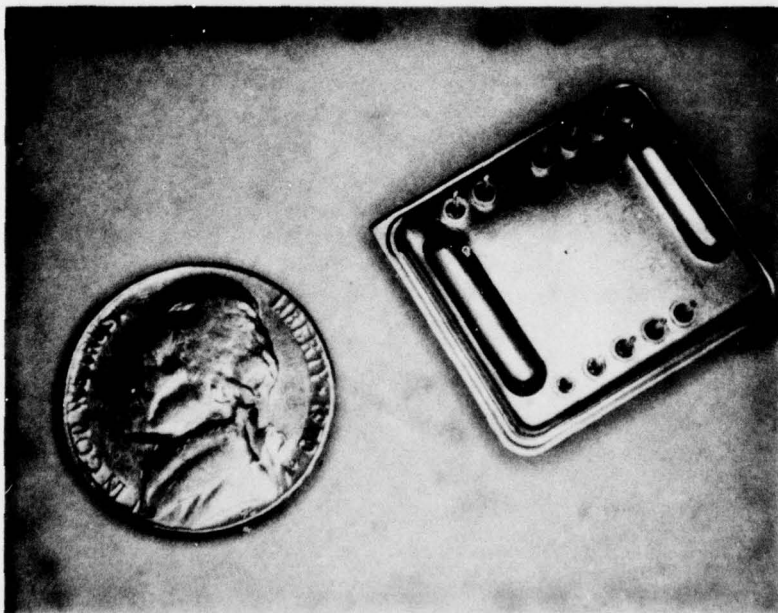


FIGURE 7

CONCLUSIONS

Three units were assembled using hybrid circuits which contain C-SOS MOS devices from the first lot. Marginal operation at the high end of the temperature range was observed, which is expected to be corrected by changing the oscillator feedback ratio. The custom case and cover were received and forwarded to the vendor of the coldweld die for his comments.

PROGRAM FOR NEXT INTERVAL

Work will continue to be directed towards completing five engineering samples of each frequency.

A data package consisting of test data, drawings, a definitive specification per MIL-S-83490, and a production layout are to accompany the engineering samples.

MANPOWER UTILIZATION REPORT

1 March 1973 to 31 May 1973

Contract No. DAAB05-72-C-5839

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Design Engineer

S. Ill. Univ., B.S. Applied Science
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Varo, Inc., 3 years
CTS Knights, Inc., Since 1969

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State Univ. of Iowa, Assoc. Prof.,
Newell Labs, Inc., President, 1 year
CTS Knights, Inc., Since 1966

Roger Zimmermann
Technician

Wisconsin School of Electronics, A.S.
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Engineering Hours Expended

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Dr. D.E. Newell 35 Hrs.

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R. Zimmermann 13 Hrs.

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13. ABSTRACT Three engineering samples of the MCTCXO were assembled using C-SOS MOS devices from the fourth manufacturing lot. Overall oscillator loop gain was found to be marginal at high temperature and it was determined that a change in the oscillator feedback ratio would correct the problem. The custom cases and covers were received and evaluated. Although they were found to be satisfactory, improvements were suggested to add a margin of safety in production.			

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